

**Course Syllabus**  
**Earth's Climate: Past, Present and Future**

**Fall Term - OLLI West**  
**September 16– November 4, 2014**

**Tuesday 9:30-11:30 am**

**Facilitator: Paul Belanger; [pebelanger@glassdesignresources.com](mailto:pebelanger@glassdesignresources.com); cell 303-249-7966**

If you are unable to attend the first session, please notify the facilitator by email.

**Readings:**

All readings will be handouts distributed weekly by e-mail or hard copies handed out in class for those without Internet access; please advise me of the latter. The readings will include excerpts from books, articles, and web site links. There are no required books for this course, although I might suggest some for those wishing to delve more into the topics at hand.

**Weekly Topics:**

Updates to the syllabus below will be updated and expanded with resources, links and suggested reading before, during and after various classes at:

<http://www.denverclimatestudygroup.com/OLLI/index.htm>. At a later date, resources, links etc. will also be entered at the OLLI portfolio website.

Class Type: Illustrated Lectures, some video and discussion; in lieu of 3rd class there will be a field trip to National Ice Core Lab located at USGS in Lakewood; <http://icecores.org/> at 9 a.m. Tuesday September 30th. I will have room for a total of 35 persons for the Ice Core Lab field trip and will solicit for other-than-class members on a first come, first served basis. See if your spouse or significant other wishes to come.

1. Tuesday September 16<sup>th</sup>, 9:30-11:30 a.m.: Introduction
  - Key principles of climate change
  - The difference between weather and climate
  - Climate system: feedbacks, cycles and self-regulation (climate, not government)
  - What determines Earth's climate
  
2. Tuesday September 23<sup>rd</sup>, 9:30-11:30 a.m.:
  - Earth's deep past before the Cambrian (600 MaBP): hot and cold
  - Earth's past: Cambrian onward: mostly hot-house Earth; 100s parts per million (ppm)
  - Climate trend in the Cenozoic – the last 65 million years; proxy data from 3600ppm to <200 ppm.
  - More recent past: 180-280 part per million; how do we know – empirical data. Preview of next week's field trip
  - Today: 400 ppm and growing 2-3ppm/year
  
3. Tuesday September 30<sup>th</sup>, 9:00-11:30-noon: (important: bring government issued ID), hat, coat, gloves for – 40 degrees F. and adequate time to be checked in at the gate – details to follow in class.

- Antarctic ice cores
  - Arctic Ice cores
  - What the data tells us
  - it will include some lecturing by Ice Core Lab personnel
4. Tuesday October 7<sup>th</sup>, 9:30-11:30 a.m.:
    - Follow up to ice core lab field trip
    - Signs of climate change/how has it changed: ocean acidification, Arctic warming
    - Global carbon emissions of Carbon dioxide (CO<sub>2</sub>) and Methane (CH<sub>4</sub>)
  5. Tuesday October 14<sup>th</sup>, 9:30-11:30 a.m.:
    - Future projections and feedbacks:
    - Models
    - Rates of change: analogs and various comparisons to the past
    - IPCC Fifth Assessment report (AR5): <http://www.ipcc.ch/report/ar5/>
  6. Tuesday October 21<sup>st</sup>, 9:30-11:30 a.m.:
    - Solutions?
    - Geoengineering: Solar Radiation Management (SRM) and Carbon Dioxide Removal (CDR)
    - The economics of doing nothing vs. the economics of mitigation
    - There is promise, but at what cost? (One might be surprised).
    - Biochar vs. BECCS solutions
  7. Tuesday, October 28th, 9:30-11:30 a.m.:
    - It's not about climate change as much as sustainability
    - Energy
    - Urban heat islands
    - Food security
    - Population growth; potential refugee issue of climate change
  8. Tuesday November 4<sup>th</sup>, 9:30-11:30 a.m.: conclusion
    - Welcome to the Anthropocene
    - Looking ahead
    - Your carbon footprint
    - Is the future of our climate still in our hands?
    - Wrap-up